

SCIENCE.

FRIDAY, JULY 11, 1884.

COMMENT AND CRITICISM.

THE increasing number of international scientific congresses whose function is the establishment of common points of departure, and the unification of standards of measure both as to dimensions and nomenclature, is a hopeful sign of progress towards the 'millennium' to which men of science are unquestionably nearer than their political brethren. It is delightful to find that there are so many important matters concerning which scientific men representing many nations and many languages find themselves in perfect agreement. Although in many instances a surrender of some personal or patriotic claims has been demanded, this has been generally acceded to with little protest, to the end that universal advantage may be the outcome. When work of this kind is done, it should be done for all time to come; at least, what is definitely fixed upon should be of such a nature that it will not need undoing in the near future.

In this respect the report of the electrical congress is something of a disappointment. The congress seems to have reached its conclusions in undue haste. Indeed, the electrical units as now defined are less precise and scientific than before. The reference of the practical units to those of the c. g. s. system was in itself admirable and satisfactory. With the new definitions, one only, that of current strength, has a precise relation to the fundamental units: the others have become arbitrary. Would it not have been better to adhere to the original ohm, and to define the mercury unit as provisional? The new mercury unit is obtained from measurements that differ among themselves by more than two per cent. Besides, the verdict was made up before the results of Professor Rowland's exhaustive

investigation, now in process, were in the possession of the congress, although this investigation was admitted to be one of the most important. A provisional mercury unit of a hundred and six centimetres would have satisfied all practical demands, and would have been subject to such correction as future research indicated to be necessary. As the matter now stands, the elegance and simplicity of the system is destroyed by the introduction of arbitrary units, the value of which may some time be found to be considerably different from that now assumed.

While the congress might have acted more wisely in the opinion of many, in the matter of the ohm, in its definition of the standard of light it would certainly have done well to postpone action for the present. It appears, that, because nothing better was offered, the square centimetre of fused platinum was adopted. Although this is a matter which is greatly in need of adjustment, there can be little satisfaction in the adoption of what is, as nearly as may be, an impossible standard. There must have been a paucity of suggestions as to a suitable standard; which is singular, considering the prominence of the problem of measuring intense lights. And in recommending that all records of observations of atmospheric electricity and earth-currents should be sent to the international bureau at Berne, the congress simply acknowledged our present ignorance.

BIBLIOGRAPHIES of special authors have but an ephemeral value, if made during the life, or at least during the activity, of a writer. It would therefore, in our judgment, have been better to restrict the one just issued by the National museum, and fully described in our notes, to Professor Baird's direct contributions to science, which have avowedly ceased, and

to postpone mention of those undertaken with the assistance of many collaborators (which record the advance of science through the researches of others), or dealing primarily with applied science. However important this latter work may have been, — and we should be far from underrating its importance, especially in the development of science in America, — it not only hinders a proper retrospect, an independent *coup d'oeil*, of his remarkably extensive and valuable contributions to the vertebrate zoölogy of North America, but it seems to demand, at some future time, a repetition of this work, with its almost painful detail and voluminous indexes. The first was the only pressing need: for the other, we could have contented ourselves for the present with the indexes of the everywhere procurable annual records, Smithsonian reports, and fish-commission publications.

A scientific friend, himself a bibliographer, does not look with complacency upon the announcement that similar bibliographies will be given of other still living naturalists. He asks whether those directing or engaged upon this work could not turn their bibliographic energies to better account in another direction. Fathers of a broad science, or pioneers in a vast field, who cover that field, are few indeed; and only their bibliographies, when carried out with the fulness of that which furnishes us our text, can have any possible permanent, or even great temporary, value. What are really wanted are topical and geographical bibliographies, which shall lighten the labor of the expert, and lessen the chances of incorrect statement, and, above all, of unnecessary re-statement. These are the true aids to progress for a generation burdened with a literature vast, ill-assorted, inchoate. Individual bibliographies do not penetrate its depths. Let our zealous bibliographers devote to such work the same time and pains they would give to that proposed, and the result will be of tenfold immediate value, and it will have at least some lasting worth.

LETTERS TO THE EDITOR.

**.* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The zero meridian of longitude.

IN arranging meridians for perpetual usefulness and the best practical results, the location of the 180th degree is of far more importance than that of zero or any other.

When we meet a ship of another nation at sea, we determine upon speaking, one of the most important objects of which is to compare longitudes. We do exchange longitudes, but on comparison we find a large difference between them. Then the question arises, Is one of our chronometers wrong, or are we mistaken as to the meridian from which the other ship reckons her longitude? This ship, by this time, is beyond the reach of our further inquiry, and hence the question cannot be satisfactorily answered. We are in more doubt than before speaking, confusion has been worse confounded, and only because we do not know positively the other's zero meridian. Among merchant shipping, on long voyages, just this sort of trouble occurs constantly, perhaps daily, to the great enhancement of risk to the safety of ships, cargoes, and crews.

Again: an English or an American ship is in mid-Pacific, steering east; crosses the 180th degree of her reckoning, from Greenwich; and then meets a French ship standing west, which has crossed the 180th degree from Paris. They speak, and each asks the other to report him at Lloyds. They arrive in their respective ports, and each reports the other, as requested: but one report states that the speaking occurred on one day, say Monday, the 1st of a month; and the other on another day, say Tuesday, the 2d of the same month. But I will not multiply instances. These two will give some idea, though faintly, of the risk to property and life, as well as the confusion of dates, caused by the present unsettled condition of meridians.

If the 180th meridian were universally recognized as passing through Bering Strait, it could be so projected as to pass clear, or nearly so, of all land throughout its entire length; and, this being true, it could be made the dividing-line of days, naturally and properly, with the greatest possible advantage to everybody everywhere.

If a meridian passing through Bering Strait were adopted as the 180th, then the zero meridian would pass through central Europe, and enter Africa near Tunis, and the Atlantic Ocean from the coast of Guinea, thereby giving Norway, Denmark, Germany, Austria, Switzerland, and Italy the opportunity of having their national observatories upon it, on their own soil.

C. BORUM.

Norfolk, Va., June 5.

Crystallization of glucose in honey.

A gentleman of our city who is engaged extensively in bee-culture has furnished me with the following rather remarkable incident:—

On opening a cap of honey that had been made subsequent to July 1 of last year, it was discovered that the entire bottom was covered with a layer of some peculiar white powdery substance never before observed. Such an occurrence being new to him, he conferred with some of his acquaintances, also engaged in bee-raising, but with the uniform result of furnishing each with a bit of news. A sample of the white substance was submitted to me, and on exami-

nation was proved to be, with the exception of slight extraneous matter, almost perfectly pure glucose.

The presence of glucose in honey is well known; but a crystallization or separation such as here described appears unknown, in this district at least, and possibly in others as well. Therefore it is that I deem this of sufficient moment to lay before your readers. A few other facts are pertinent. The bees in whose hive the glucose was found have never been artificially fed, nor has any special attention been paid to promote an increase in the yield of honey. Nevertheless, the yield from the hive containing the powder has exceeded, by almost three times, that of any previous year. A sample of the honey will be furnished me, when I propose determining the relative quantity of glucose contained in it, thinking that by that means some light may be thrown on this apparently unique occurrence.

SIMON FLEXNER.

Louisville, June 18.

[All honey contains glucose and cellulose in about equal proportions. It is not uncommon for honey to granulate or crystallize in the comb. This crystallization often occurs when the cells are but partly full of honey, so that the granulated sugar only occupies a part of the cell. If such combs are placed in a hive, the bees will add honey, and produce the phenomenon noticed, and described above. There is nothing remarkable or very exceptional in this occurrence, though it occurs so rarely that it is not strange that most apiarists have failed to observe it.—ED.]

North-eastern and north-western Indian implements.

In reply to a note contained in *Science*, iii. 701, I beg leave to explain that Dr. Abbott misapprehends the object of the paper there discussed, my point of view therein having been that of an observer simply, not that of a critic. The particular puk-gah-mah-gun in question received description and illustration in virtue of the definite facts, that it represents the stone age of the north-west, that it is a well finished and mounted typical weapon, that it is of known tribal origin and of ascertained uses, and that, finally, it has an interesting and assured history. If my brief notice of this weapon ignored the diversity of figure found among objects of the war-club pattern, it was partly because I had undertaken to present my notes in a condensed form, and partly, also, because I believed such modification of common type generally understood by those who would be likely to honor me with a reading. I venture in this place to append one or two statements which may, perhaps, have the effect to place matters in a clear light.

The Ojibwas of Red Lake originally descended thither from Rainy Lake, their primary point of departure having been the 'Great Ojibwa,' or Lake Superior, where their tribe claims to have been centralized for ages. The Red-Lakers agree that they effected settlement here about a century ago, after a desperate struggle of long duration with the Sioux, who then inhabited the region; and they impute their eventual success, not so much to superior prowess, as to the fact that the Ojibwas fought with weapons procured from French traders at the north, while the more isolated Sioux were restricted to war implements of their own manufacture. The Red Lake band continued in the stone age, so far as their domestic furnishings were concerned, long after they had discarded their tribal weapons of stone and bone. As they are by no means addicted to nice culinary distinctions, it occurred to me, in the course of investi-

gation, that the bone-breakers, being adapted to deal an effective blow, might, at the early day preceding contact with white traders, have served their owners the double purpose of utensil and weapon; that, in short, the objects used only within historic times for breaking up the bones of game might likewise have been employed prior to such time in dealings with their foe. This conjecture determined the particular line of inquiry which I followed in questioning the natives, and which was without positive results always. The matter would be unworthy of mention here, except for the purpose of correcting a misconception.

FRANC E. BABBITT.

What's in a name?

It is a pleasant diversion to note the correspondences between people's names and occupations. Here, for instance, are the Meisels, German lithographers; and *meissel* is the German word for chisel, a cutting instrument. Wagner, the inventor of the palace-car, learned the wagon-maker's trade, and subsequently built his railroad-wagon; while his rival, George Pullman, justifies his name by pulling his fellow-men about the world in very sumptuous railroad-coaches.

Turning to the New-York directory, you see, that, out of the 204 Wagners there set down, 10 are in some way concerned with the making or sale of wagons. Out of 132 Carpenters, 17 are either carpenters or builders, or dealers in wagon-materials. Of 1,174 Schmidts, Smidts, Schmiedes, Schmidts, Schmitts, and Smiths in New York, 202 are men who use edged tools for the cutting of wood or iron, including blacksmiths, goldsmiths, cabinet-makers, carpenters, etc.: a large number, not included in the 202, are shoemakers and tailors; but these can hardly be called smiths or artificers.

In the Boston directory, out of 336 Clarks (only a small fraction of the whole), 63 are either store-clerks or religious clerics, or engaged in pen-work of some kind. There are 420 Schneiders (or cutters) in New York, and 29 of them are tailors; but of the 91 Sneideres, Sniders, and Snyders, there is not one tailor, and only two cutters of any sort; namely, a cap-maker and a dressmaker. It would seem that the Sniders, in mixing English blood with their own, and trying new fortunes in foreign lands, had got farther away from the instincts of the original trade that gave their German ancestors their name. It certainly seems that it is safe, looking at the data given, to assume that the hereditary tendencies denoted by the name are in many cases marvellously persistent. I have no doubt, that, notwithstanding the continual mingling of new blood (by marriage) with that of each class of tradesmen, we should yet find, if we could know the bent of mind of all members of the class, that the ancestral preferences and aptitudes exist in some degree in each and all. It is to be remembered, that, in the case of such names as Carpenter and Schneider, there would be a more or less strong disinclination for the owners to engage respectively in carpentry and tailoring, owing to the dislike of having to endure the lifelong punning on their names.

All that can be shown is, that, in the case of a certain number (say, one-sixth) of the members of a family or clan, the ancestral occupation reveals its pristine attraction. But the exceptions are notable. Thackeray's ancestors, according to Bardsley, were thatchers (thack, thatch, hence the thacker, and the last modified into the thackery, the thackeray, i.e., the thatcher). Shakeshaft, Shakespeare, Breakspear, from their prowess in battle; Spencer, he who has charge of the spence, or buttery; Whittier, from

white-tawier (the verb 'to taw' meaning to dress the lighter skins of goats and kids, and then whiten them for the glover's use); Stoddard, the stot-herd, or bullock-herd, or herdsman; Palfrey, the farmer who rides his palfrey to market, — here, in the case of well-known persons, we have instances of wide departure of descendants from the trade of their ancestors.

W. S. KENNEDY.

A muskrat with a round tail.

It has generally been considered that the compressed, rudder-like tail, and large webbed hind-feet and bent toes, of the muskrat, form its essential distinguishing peculiarities: my surprise was therefore great to find among some specimens recently received from Mr. William Wittfeld of Georgiana, Fla., an animal, which, though resembling an ordinary muskrat in general appearance, possessed neither of these characteristics. It looked, indeed, like an overgrown and dropsical house-rat, and was at first entered in the catalogue by my assistant as a doubtful species of that genus. Its form also suggested that of a pouched rat (*Thomomys*), but unfortunately there were no pouches. An examination of the skull at once dismissed these erroneous notions, and revealed the true character of the animal. It is, without doubt, a living link binding the muskrat we know so well with the field-mouse. In size it stands between the two. Its eyes, ears, and fore-feet are those of a muskrat; but its tail and hind-feet are those of a field-mouse. I have not yet received any particulars regarding the habits of this Floridan muskrat; but the slight webbing of its toes, and their unbent condition, taken together with the rounded tail, would lead one to prophesy that it is not so thoroughly aquatic as the ordinary muskrat, probably not more so than many of the field-mice.

The ordinary muskrat has never been found in southern Florida, and it is now apparent that its place is supplied by this little relative. I may go aside to say that Florida probably still holds in its southern interior a number of creatures which the eye of science hath not seen, and which will modify the notions we have regarding those already known. As this is the scientific birth of this interesting little mammal, it is necessary that it should be given a name: I therefore christen it with the name of my friend, Mr. J. A. Allen, whose monographs of the North-American mammals are so well known and so highly esteemed; and it shall hereafter be known as *Neofiber Alleni*. I may, perhaps, be permitted to conclude by summing up briefly the characters of the species, in order that there may be no mistake regarding the appearance of the animal.

Neofiber Alleni.—General form and color, head, eyes, ears, and fore-legs as in *F. zibethicus*. Hind-feet not exceeding twice the fore-feet in length, with straight, slightly webbed toes, and naked soles. Tail round, scaled, and sparsely covered with dull-brown hairs. Length of head and body, 20.2 centimetres; tail, 12.7 centimetres; hind-foot (without claws), 3.9 centimetres.

FREDERICK W. TRUE.

U. S. national museum, Washington,
June 30.

Fish-remains in the North-American Silurian rocks.

The English Ludlow Rocks have long been known as the lowest horizon from which undoubted remains of fish have been obtained. The 'bone-bed' of this group has yielded several species. The earliest

known American fossil fish occur in the lower Devonian beds of Ohio (corniferous) and in the Gaspé sandstones of the Gulf of St. Lawrence.

But some fossils have, during the past year, come into my possession, a glance at which is suggestive of near relationship to the peculiar forms of the English Ludlow Rocks. Close examination has confirmed this opinion, and abundantly proved that fish existed on this continent as early as in England. Indeed, should the whole evidence I have obtained be equally valid, it will sustain the conclusion that we have here more ancient ichthyic forms than any yet known elsewhere.

I have entered a paper on the subject for the approaching meeting of the British association at Montreal, when the facts on which these conclusions rest will be given in detail.

E. W. CLAYPOLE.

Buchtel college, Akron, O., July 2.

Babirusa tusks from an Indian grave in British Columbia.

Many curious and unlooked-for objects are frequently found in Indian graves, and not least among these is a pair of the tusks of the Babirusa. They were extracted in August of last year by Mr. James S. Swan from the grave of an old Indian doctor at Kah-te-lay-juk-te-wos Point, near the north-western end of Graham Island, one of the Queen Charlotte Islands, off the coast of British Columbia. The Babirusa, as every one knows, is an animal of the hog tribe, inhabiting only Celebes and the adjacent islands. The question then arises, How did these teeth come into the possession of the Indian doctor, who died some fifty years since at an advanced age?

Mr. Swan suggests an ingenious and plausible solution of the problem. In his letter of the 4th of January to Professor Baird, he writes as follows: "Lieut. Bolles, of the U. S. surveying schooner *Ernest*, tells me that the Siamese junks make regular trading-voyages to the coast of Africa, even as far as the Cape of Good Hope, running down with the north-east monsoons, and returning when the favorable monsoon blows. They bring products of every kind, and trade with Japan and China. He thinks that some of these junks may have been wrecked, and carried by the Japanese current to the American side, and perhaps cast ashore on the west coast of the Queen Charlotte Islands, where quantities of drift-stuff of every kind is to be found.

"Charles Wolcott Brooks, in his able report on Japanese vessels wrecked in the North Pacific Ocean, read before the Californian academy of sciences, March 1, 1876, says, 'Every junk found adrift or stranded on the coast of North America, or on the Hawaiian or adjacent islands, has, on examination, proved to be Japanese, and no single instance of any Chinese vessel has ever been reported.'

"One of these junks was wrecked on the Queen Charlotte Islands in 1831, and numerous others have been wrecked on other parts of the north-west coast. The tusks of the Babirusa were undoubtedly an article of commerce among a people who would be likely to use them for carving or for manufacturing into fancy articles, and it is not improbable that the tusks in question were procured from some one of these old Japanese wrecks."

It is difficult to conceive of another origin for these tusks. The commerce of California fifty years ago was of a very limited character, and Babirusa tusks are among the objects least likely to have been sent there through any regular channel.

F. W. TRUE.

U. S. national museum, Washington, D.C.,
July 3.

*SPECIALIZATION IN SCIENTIFIC
STUDY.*

THERE ONCE was a science called 'natural philosophy,' which, like some old synthetic types of animals, held in itself all the learning that applied to physical facts. By the beginning of this century this science of natural things had become divided into physics and natural history. These divisions have since spread, like the divisions of a polyp community, until now natural history has more than a dozen named branches; and in physics the divisions are almost as numerous. There are now at least thirty named and bounded sciences; each name designating a particularly limited field, in which there are able men who work their days out in labor that does not consider the rest of man as having any relation to their work.

This progressive division of labor follows a natural law: and it is perhaps fit that science should itself give a capital illustration of the application of this law to forms of thought, as well as to the more concrete things of the world; but it is an open question whether or no it is advantageous to the best interests of learning. There can be no question that the search for truth of a certain quality is very greatly helped by this principle of divided labor. If a man wish to get the most measurable yield out of the earth in any way, the best thing for him is to stake off a very small claim, tie himself down to it, fertilize it highly, till it incessantly, and forget that there are blossoms or fruit beyond his particular patch; for any moment of consciousness of such impracticable things as grow beyond his field is sure to find its expression when he comes to dig his crop, whether his crop in the intellectual field be elements or animals, stars or animalculae. The harvest of things unknown is most easily won in this kitchen-gardening way of work.

The world needs, or fancies that it needs, this kind of work; and it is now of a mind to pay more of its various rewards for the least bit of special and peculiar knowledge than for the widest command of varied learning. In a thousand ways it says to its students, not only

as of old, "Study what you most affect," but, "*Effect that study altogether*, know the least thing that can be known as no one else knows it, and leave the universe to look after itself."

This is the prescription of our time. We are now proceeding on the unexpressed theory, that, because no man can command the details of all science, therefore he shall know only that which he can know in the utmost detail. We seem to be assuming, that, if many separate men each know some bit of the knowable, man in general will in a way know it all; that when, in another hundred years of this specialization, we have science divided into a thousand little hermit-cells, each tenanted by an intellectual recluse, we shall have completed our system of scientific culture. No one can be so blind to the true purposes of learning as to accept this condition of things as the ideal of scientific labor. It may be the order of conquest, the shape in which the battle against the unknown has to be fought; but beyond it must lie some broader disposition of scientific life,—some order in which the treasures of science, won by grim struggle in the wilderness of things unknown, may yield their profit to man.

The questions may fairly be asked, whether we have not already won enough knowledge from nature for us to return, in part, to the older and broader ideal of learning; whether we may not profitably turn away a part of the talent and genius which go to the work of discovery to the wider task of comprehension; whether we may not again set the life of a Humboldt along with the life of a Pasteur, as equally fit goals for the student of nature.

Until we set about the system of general culture in science, it will be nearly impossible to have any proper use of its resources in education. A sound theory of general culture in science must be preceded by a careful discussion of the mind-widening power of its several lines of thought. This determination cannot be made by men versed only in their own specialties: it must be made by many efforts to determine by comparison what part of the sciences have the most important power of mind-

developing. At present there are few men whose opinion on such a subject is worth anything, and the number constantly grows less.

The greatest difficulty partly expresses itself in, and partly arises from, the multiplication of societies which include specialists as members, and specialties as the subjects of their discussions. We no longer have much life in the old academies, where men of diverse learning once sought to give and receive the most varied teaching. The geologists herd apart from the zoölogists: and in zoölogy the entomologists have a kingdom to themselves; so have the ornithologists, the ichthyologists, and other students. 'That is not my department,' is an excuse for almost entire ignorance of any but one narrow field. If naturalists would recognize this 'pigeon-holing,' not only of their work, but of their interests, as an evil, we might hope to see a betterment. Until they come to see how much is denied them in this shutting-out of the broad view of nature, there is no hope of any change. Special societies will multiply; men of this sort of learning will understand their problems less and less well; until all science will be '*caviare* to the general,' even when the general includes nearly all others beyond the dozen experts in the particular line of research.

The best remedy for this narrowing of the scientific motive would be for each man of science deliberately to devote himself, not to one, but to two ideals; i.e., thorough individual work in some one field, and sound comprehension of the work of his fellows in the wide domain of learning, — not all learning, of course, for life and labor have limits, but of selected fields. In such a system there will be one society-life meant for the promotion of special research, and another meant for the broader and equally commendable work of general comprehension.

It is in a certain way unfortunate that investigation is to a great extent passing out of the hands of teachers. This, too, is a part of the subdivision work; but it is in its general effects the most unhappy part of it. As long as the investigator is a teacher, he is sure to be kept on a wider field than when he becomes a solitary special worker in one department.

The efforts now being made for the endowment of research will, if successful, lead to a still further tendency to limit the fields of scientific labor. A better project would be to keep that connection between inquiry and exposition from which science has had so much profit in by-gone times.

HIBERNATION OF THE LOWER VERTEBRATES.

IN a recent article in *Science*, I gave the details of a series of observations of the habit of hibernation as it occurs among our mammals, and endeavored to show that this habit was not so fixed and regular as is commonly supposed.

When we come to study, in their native haunts, our reptiles and other lower vertebrates, it will be found that the same is true of them also. For instance: the turtles, as a class, are supposed to hibernate; but this is not strictly true of all of them. There are nine species of these animals, more or less abundant, in my neighborhood. One, the common box-tortoise, is strictly terrene; while the others are either aquatic or semi-aquatic. The box-tortoise more regularly and systematically hibernates than do any of the aquatic species. After two or three hard frosts, it burrows quite deeply into the earth, and seldom quits its hiding-place until every vestige of winter has disappeared. The appearance of the box-tortoise is the best 'sign' of settled spring weather that I know, though it sometimes fails; but to assert that "tortoises creep deep into the ground, so as to completely conceal themselves from view when a severe winter is to follow," and that "they go down just far enough to protect the opening of their shells"¹ when it is to be mild, is nonsense. The water and mud turtles, of which I have carefully studied eight species, appear, on the approach of cold weather, to bury themselves deeply in the mud at the bottoms of ponds and streams, and to remain there until spring. This is the common impression; and a superficial glance at their haunts during the winter seems confirmatory of it. Is it, however, strictly true of these turtles? The habit of hibernating is at least affected very materially by the severity of the winter. Furthermore, in most ponds of any considerable extent, frequented by turtles, there are sure to be one or more deep holes wherein many of the

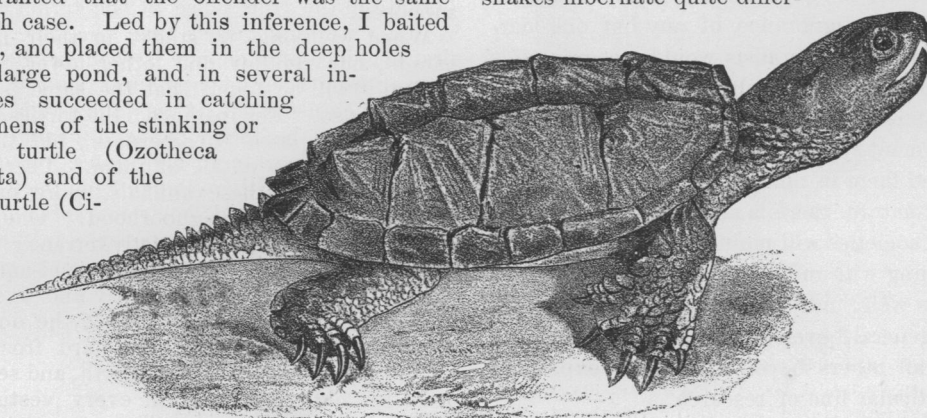
¹ Signal-service notes, No. ix.: Weather-proverbs. 1883.

turtles take refuge after the first hard or plant-killing frost. There they remain in the deeper and warmer water, when the shallower portions of the pond are coated with ice. Do they lie in the mud, in these holes, in a torpid condition?

Throughout the winter I have found that many of our fish also congregate in these same deep holes, and the turtles prey to a certain extent upon them; the snapping-turtles (*Chelydra serpentina*) occasionally catching one, and the other turtles feeding upon the remains of the snapper's feast. What first gave me this impression was the fact, that even in mid-winter, in nets set under the ice, I frequently found fishes that had been partially eaten; and, as this also occurs in summer, I took it for granted that the offender was the same in each case. Led by this inference, I baited hooks, and placed them in the deep holes of a large pond, and in several instances succeeded in catching specimens of the stinking or musk turtle (*Ozotheca odorata*) and of the mud-turtle (*Ci-*

some six months of each year; and, again, it is certain that the species mentioned as active during the winter, do also, under certain conditions, regularly hibernate. The most, therefore, that can be claimed from my observations, is, that the habit, in some species, if not all, is under the control of the animal, and that its exercise is optional.

Snakes, I find, are by far the most sensitive to cold of all our animals, and avoid exposure to it by every available means. Certain of them, when hibernating, are stiff, cold, and unyielding, their condition more nearly resembling death than that of other animals under like conditions. Still we see a difference in the conditions when we compare the habit as exercised by different species. The water-snakes hibernate quite differ-



CHELYDRA SERPENTINA (ONE-HALF NATURAL SIZE).

nosternum pennsylvanicum). In the same way snapping-turtles have been caught, during the severest cold weather, in deep holes, and about large springs that discharge their waters on level ground. It would seem, therefore, that, if the water remains above the freezing-point, these turtles can remain in a fairly active state, even though they do not find any large amount of food. In such spring-holes the grass remains green throughout winter; a few frogs linger in the waters; an occasional bittern haunts the spot; pike, too, are not unusual; and the snapper, therefore, has company at least, and occasionally he makes a meal of some one of the hardy visitors, which, like himself, brave the winter, and do not seek to avoid its rigors by a protracted torpid sleep. As I have not found specimens of each of the aquatic and mud turtles under such circumstances, it may be that some of them are less hardy, and do regularly hibernate for

ently from upland snakes. The former seek refuge from the cold in mud beneath water: the latter burrow into dry earth. The former, when disturbed, or on exposure to the atmosphere, 'come to' almost immediately: the latter may be literally broken into pieces without giving evidence of life. By 'water-snakes' I mean, not one or two species of *Tropidonotus*, that are strictly aquatic, but the several garter-snakes (*Eutaenia*), and all those that readily take to the water when pursued, as distinguished from the terrestrial species proper, such as the black snake, adder, calico-snake, and others. Indeed, I have sometimes wondered if the true water-snake (*Tropidonotus sipedon*) really hibernates at all. By dipping a foot or two beneath the sand of any spring-hole, we can usually find one or more of these snakes; and, though somewhat sluggish in their movements, they are not slow to swim off when released, however cold the water may be. I have

noticed, further, that this species and the common garter-snake (*Eutaenia sirtalis*) are



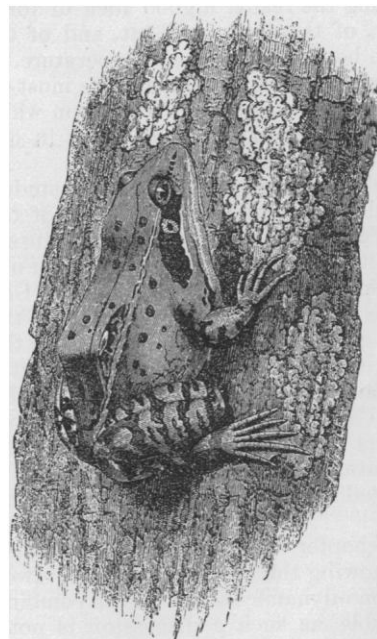
HYLA VERSICOLOR (NATURAL SIZE).

the first to re-appear in the spring; and, of all our serpents, these sleep least profoundly.

Passing now to the batrachians, my observations upon the hibernation of the turtles applies equally to the frogs and salamanders. The toads and tree-toads, terrestrial and arboreal animals, are more sensitive to a low temperature than the frogs and salamanders, and therefore disappear quite promptly after a few frosts in autumn, and are seldom seen again until the weather is uniformly mild. On the other hand, this does not hold with the aquatic batrachians. When the ice begins to form along the edges of the ponds, and hoarfrost has wilted the grass, frogs and salamanders withdraw to the deeper and warmer waters,—the former to the bottoms of ponds and deep ditches; the latter to the uniform temperature of the springs, and its adjacent mud. They do not, at this time, enter directly into a torpid condition. They appear, rather, to be sleeping lightly, and, when disturbed, respond by hopping or running off, as the case may be. Of course, the warm spots about bubbling springs soon become crowded, and hibernation proper is the only alternative; but those that can retain their positions in such springs quietly remain from autumn until

spring, sleeping, it may be, but never becoming torpid. During the winter I have found all of our frogs, and three species of salamanders, congregated in a hogshead sunk in the ground to collect the waters of a spring. Here I have watched them closely during the winter months; and the only variation from their ordinary habits of the rest of the year was, that they kept close to the bottom of the hogshead, and seldom voluntarily moved about. All their functions were, of course, very sluggish; and life was sustained by skin respiration, as with the turtles under like circumstances.

It is scarcely necessary to pursue this subject further. What has already been said of the aquatic reptiles and batrachians is applicable to fishes. To a certain extent, these hibernate in the true sense of the term; but it is the exception rather than the rule. The first evidence of a change is seen in the withdrawal from their usual haunts as the water becomes chilled; but, if we follow this movement, it will be found to be a change from shallow to deep waters; and, unless the cold is very intense, a further change from deep water to mud is not adopted. A remarkable feature of the hibernation of fishes consists in the fact, that, while many individuals of a given species



RANA SYLVATICA (NATURAL SIZE).

may sometimes be found lying in the mud in a torpid condition, others of the same species,

frequenting the same stream, may simply congregate about some bubbling spring, that, issuing from the bed of the pond or creek, tempers the surrounding waters, and renders it habitable during the severest weather. This, it seems to me, is a marked instance of the exercise of choice on the part of fishes, and has an important bearing on the question of their intelligence; and it is, furthermore, corroborative of the statement, made at the commencement of our former article, that hibernation is a faculty which many animals possess, the exercise of which is largely, if not wholly, optional.

CHARLES C. ABBOTT, M.D.

TAIT'S HEAT.

Heat. By P. G. TAIT. London, Macmillan, 1884. 368 p. 8°.

THE author says in his preface, "Clerk Maxwell's work is on the theory of heat, and is specially fitted for the study; that of Stewart is rather for the physical laboratory: so that there still remains an opening for a work suited to the lecture-room."

The book before us is the best text-book for a student who is beginning the study of heat that we have seen. The author begins by giving the reader a good idea of force and energy, of the nature of heat, and of the difference between heat and temperature. Heat is a form of energy: temperature must at first be looked on "as a mere condition which determines which of two bodies, put in contact, shall part with heat to the other."

We do not, however, think that a student can get a clear idea of the second law of thermodynamics, and of absolute temperature, from the brief sketch given in chap. iv. In order to have confidence in the deductions from Carnot's cycle, a much more thorough study of thermodynamics is necessary. Chap. xi., on thermoelectricity, contains a very good account of the theory and of the experimental part of the subject. The results of Tait's experiments upon the form of the thermo-electric lines at high temperatures are given, and also a table of the calculated specific heats of electricity for many metals.

The chapter upon combination and dissociation, showing the application of the two laws of thermodynamics to chemical combination, is valuable, as such a discussion is not often to be found in text-books.

This book is not everywhere easy reading. Though by far the greater part can be understood by a student who has no knowledge of

differential calculus, yet there are certain parts — as in the application of Fourier's method to determine the temperature of the earth's crust, and in chap. xxi., on the elements of thermodynamics — where a knowledge of calculus is necessary.

MERRIMAN'S METHOD OF LEAST SQUARES.

A text-book on the method of least squares. By MANSFIELD MERRIMAN. New York, Wiley, 1884. 8+194 p. 8°.

THIS author published his *Elements of the method of least squares* in 1877. It was favorably received; and, the edition having been exhausted, the work has been now recast, and republished under the above title. In the original work the author attempted, in the first part, to explain the method, and its application to the combination of observations, and, in the second part, to establish analytically the mathematical principles of the subject. In the present work the principles are first developed, and the applications follow: this order of arrangement must, on the whole, be better than the other. The endeavor to have the reader become practically acquainted with the subject before he makes any extended analytical study of it, may possibly enable the student who is somewhat deficient in his mathematical training to obtain a command of the method when otherwise it would be beyond his reach; but it does not seem worth while to assume that those who are to use this method are such poor mathematicians that the work should be modified in this way for their benefit. The author has done well in this new work in making a straightforward, logical development of the method and its applications. In a cursory examination of the work, it does not appear that the author has, in general, enlarged the book by materially adding to the theoretical part, which was already sufficient for the purposes in view. The additions are found in the practical portion of the work, and are of a nature to considerably enhance its value to the civil engineer, for whom the book is primarily intended.

It has seemed to the writer that the introductory chapter, which treats of the general principles of probability, might have been enlarged to advantage, or at least that the reader should have been referred to some good source of information, such as the excellent little book of Whitworth on choice and chance; as this is a subject respecting which he probably has little or no previous knowledge. Taken as a whole,

this is a very useful and much-needed textbook, and will exert a strong influence to extend the knowledge of the correct method of the comparison and combination of observations, which is so essential, not only to the progress of astronomy and geodesy, but to physics and chemistry as well, and to every branch of science which deals with refined measurements of quantity of any kind by the help of instruments of precision.

THE SOCIETY FOR PSYCHICAL RESEARCH.

Proceedings of the Society for psychical research.
Vol. i. (containing parts i.-iv.). London,
Trübner & Co., 1883. 337 p. 8°.

THE four reports of the Society for psychical research which have been issued at intervals during 1882 and 1883 have now appeared in the form of a handsome volume, and it cannot be denied that they constitute a formidable body of evidence in favor of certain beliefs which have hitherto been looked upon with peculiar suspicion and distrust. A brief *résumé* of the testimony does not do it justice, for it derives its weight from the cumulative effect of its large amount. No one who is interested in bringing fresh regions of ignorance under the domain of scientific investigation should fail to read the proceedings for himself.

The society was organized on Feb. 20, 1882; but several of its members had been engaged in private research in the same direction for some years before. Its object was stated to be the investigation of an important body of remarkable phenomena, resting upon the testimony of many competent witnesses, including observations recently made by scientific men of eminence in various countries, and *primâ facie* inexplicable on any generally recognized hypothesis. The distinction of its founders is such as to completely dissociate it from the race of the long-haired, and to insure at once respectful consideration for whatever facts it vouches for. They include such names as Balfour Stewart, Arthur Balfour, Professor Barrett, Edmund Gurney, F. W. H. Myers, Archbishop French, and Professor Henry Sidgwick (the president). The members are not committed to any theory, and are not advocates of any cause. It is their intention to remove, if possible, what they justly say is a great scandal, — the existing state of absolute doubt as to whether phenomena testified to by a large

number of generally credible witnesses, and of great scientific importance if true, can be properly authenticated or not. Their experiments are conducted with the most rigid precautions against deception and mistake, and, what is equally important, recorded with scientific precision. Six committees were formed for the consideration respectively of thought-reading, mesmerism, Reichenbach's experiments in regard to a peculiar sensitiveness to electric currents, apparitions and haunted houses, physical phenomena, and the collection and collation of existing materials bearing on the history of these subjects. Of their several reports, those of the committee on thought-reading, or thought-transference, as they call it later, are the most striking. The signification of the term 'thought-transference' is limited to the communication of a vivid impression or a distinct idea from one mind to another, without the intervening help of the recognized organs of sensation. No account is taken, very naturally, of experiments in which there is physical contact between the persons concerned, or in which there is the slightest possibility of conveying information by sight or hearing. The extreme perfection to which a code of signals may be brought leads the committee to distrust all observations where two particular persons are necessary for the results obtained. Their most remarkable subjects for thought-transference have been found in a family in Derbyshire, that of Mr. Creery, a clergyman of high character, whose integrity has, as it happens, been exceptionally tested. He has five daughters, of ages between eleven and eighteen, all thoroughly healthy, and as free as possible from morbid or hysterical symptoms. All of these children except the youngest are able to designate correctly, without contact or sign, an object fixed on in the child's absence, — not, indeed, every time, but far more frequently than probability would allow as the result of chance. The child, on returning to the room, stands close to the door, amid absolute silence, with her eyes on the ground: often she does not return, but guesses from the adjoining room, with the door closed. The children have been experimented upon at their home by the committee, by Professor Barrett, by Mr. and Mrs. Sidgwick, and by Professor Balfour Stewart, as well as at the houses of different members of the committee at Cambridge and at Dublin. The objects guessed have been chiefly cards from a full pack, and numbers between ten and one hundred; but remarkable success has been obtained, also, in guessing names chosen at random, as in the following list: —

William Stubbs.
Sophia Shaw.
Timothy Taylor.

Isaac Harding.
Albert Snelgrove.

Tom Thumb.
Cinderella.
Chester.

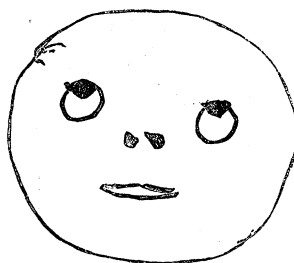
Pipe.
Fork.
Corkscrew.
Tongs.

'William Stubbs.'
'Sophia Shaw.'
'Tom Taylor —
Timothy Taylor.'
'Isaac Harding.'
'Albert Singrore —
Albert Grover.'
'Tom Thumb.'
'Cinderella.'
'Manchester —
Chester.'
'Plate — paper — pipe.'
'Fork.'
'Corkscrew.'
'Fire-irons — poker.'

From the summary of results, it appears, that, out of every 610 trials with playing-cards, there were 118 correct guesses on the first trial, and 76 on the second; or that, counting the first trial only, there was 1 correct guess out of every 5.17, instead of 1 out of every 52, as would be given by chance alone. Of 260 numbers, 68 were guessed correctly the first time, and 35 the second time, or, on the first trial, 1 out of every 3.82; whereas from chance would have given only 1 out of every 90. Where the trial is counted as a failure, it frequently happened that the suit, or the number of pips of the card, or one figure of the number, was guessed correctly. The partial successes, as in the guesses for 'pipe' and 'tongs,' given above, strike us as even more remarkable, and more likely to throw light upon the subject, than the complete ones. The children, when questioned, agree in saying that two or three ideas of similar objects come before their minds, and that, after a moment's reflection, they select that which stands out with the greatest vividness. Their power, instead of improving with use, has been gradually diminishing. At first, especially when they were in good humor, and excited by the wonderful nature of their guessing, they seldom made a mistake. They have been known to name seventeen cards right in succession.¹ Their gradual decline of power somewhat suggests the disappearance of a transitory pathological condition. On the other hand, a larger number of good subjects has been found than there was reason at first to look for.

Much more remarkable than experiments with cards or numbers, where there is at least an appreciable chance of getting right by accident, are those in which an impression of a

drawing is conveyed from one mind to another, without contact, or any conceivable use of the ordinary means of communication. In these



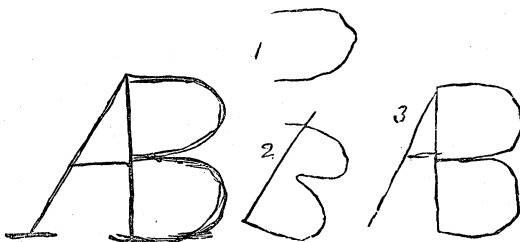
ORIGINAL.



REPRODUCTION.

Inner circle begun at point marked +, and then carried round in one continuous line from left to right.

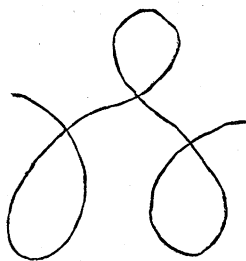
experiments, Mr. Blackburn, an associate of the society, who is described as a very painstaking and accurate observer, is the operator; and Mr. Smith, a young mesmerist of Brighton,



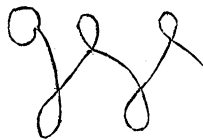
ORIGINAL.

REPRODUCTION (THREE ATTEMPTS).

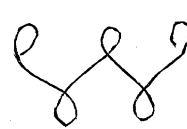
is the subject. Mr. Smith is seated, blindfolded, at a table in one of the rooms of the society; paper and pencil are within his reach, and a member of the committee is seated by his side. Another member of the committee leaves the room, and outside the closed door draws some figure at random. Mr. Blackburn is now called out, the door is closed, and



ORIGINAL.



REPRODUCTION.

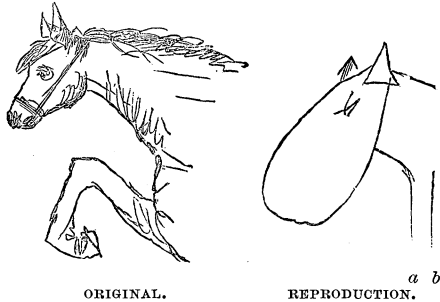


ORIGINAL AS MR. BLACKBURN REMEMBERED IT.

the drawing is held before his eyes for a few seconds. Closing his eyes, Mr. Blackburn is led back into the room, and placed, standing or sitting, behind Mr. Smith, at a distance of some two feet from him. After a brief period of intense mental concentration on Mr. Black-

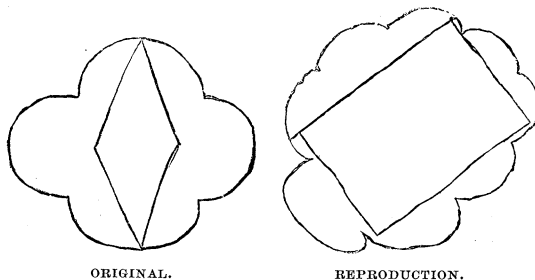
¹ The chance of doing, which, by accident, is as 1 to 52¹⁷.

burn's part, Mr. Smith takes up the pencil, and, amidst the absolute silence of all present, reproduces as nearly as he can the impression he has received. Mr. Blackburn keeps his eyes closed (sometimes they are bandaged as an aid to concentration); and he has not touched Mr. Smith, and has not gone in front of him, or in any way within his possible range



Mr. Smith had no idea that the original was not a geometrical diagram. He added line *b* some time after he had drawn line *a*, 'seeing a line parallel to another somewhere.'

of vision, since he re-entered the room. Sixty pages of the drawings and reproductions are given, — facsimiles of the originals from which they have been photographed on the wood blocks. The reproductions are rude copies of the drawings, such as a child might make, blindfold, of a picture he had just seen; but in every case the resemblance is recognizable, and sometimes it is very exact. A particularly good one was made, when, with a view of removing all doubt as to possible auditory communication, Mr. Smith's ears were stopped



with putty, a bandage was tied round his eyes and ears, a bolster-case was fastened over his head, and over all was thrown a blanket which enveloped his entire head and trunk; and Mr. Blackburn sat behind him as still as it is possible for a human being to sit who is not concentrating his attention on keeping motionless to the exclusion of every thing else. To profit by a code of signals in this case, Mr.

Smith would have had to extract the putty from his ears, and, still smothered in bolster-case and blanket, to detect periodic variations in Mr. Blackburn's breathing imperceptible to the committee, and to interpret them into a description of a very irregular figure. This hypothesis seems to the committee an extreme one, but they intend to meet it by still further varying the conditions of future experiments.

The record is given of another set of experiments made upon two young ladies at Liverpool, under the strictest conditions, by Mr. Guthrie and Mr. Birchall. The following were among the guesses: —

- | | |
|---|---|
| A gold cross. | 'It is yellow — it is a cross.' |
| An egg. | 'Looks remarkably like an egg.' |
| A penholder, with thumb inverted on the end. | 'A column, with something bell-shaped turned down on it.' |
| Letter Q. | 'Q.' |
| A dark-crimson apple. | 'Is it round — a dark-red shade — like a knob of a door? — It is an apple.' |
| A key. | 'A little tiny thing, with a ring at one end, and a little flag at the other, like a toy-flag.' Urged to name it, replied, 'It is very like a key.' |
| A pair of scissors standing open and upright. | 'Is it silver? — No: it is steel — it is a pair of scissors standing upright.' |

The usual phenomena were obtained by the committee on mesmerism, but with the utmost precaution against collusion and fraud. The cases which do most to stagger a cultivated scepticism are those in which the subject remains in a perfectly normal condition, with the exception of *local* effects produced on him without contact, and without any possibility of expectation on his part. The following experiment was repeated thirty or forty times without a single failure. The subject was blindfolded and seated at a table, on which his ten fingers were spread out before him. A screen formed of thick brown paper quadruply folded was placed in front of him, extending far beyond him in all directions. Two of his fingers were then selected by one of the committee, and silently pointed out to the mesmerizer, who proceeded to make very gentle passes over them; and to prevent the communication to the subject of a sensation of change of temperature, or a current of air, a member of the committee made, as nearly as possible, similar passes over two others of his fingers. After a min-

ute or less, the two fingers mesmerized proved to be perfectly stiff and insensible: the points of sharp instruments might be plunged deep into them, or a lighted match might be applied to the sensitive region around the nail, without producing a sign or a murmur. It is difficult to suppose that an ordinary youth, sitting with relaxed limbs in quiet unconcern, would be able to control, by the exercise of his will, every sort of reflex start or twitch when a naked flame is applied to one of the most sensitive parts of his person. To meet such an objection, however, the experiments were repeated with other subjects with equal success, — one of them a delicate woman, whose shrinking from pain was such that the prick of a fork on one of her unmesmerized fingers would cause a half-hysterical cry. The hands of the subject may even be mesmerized when he is in the mesmeric sleep; and then the usual clap and call restore him to consciousness, but do not permit him to remove his hands from the sofa, to which they seem to be glued, until after they have been separately released.

We pass over the report of the Reichenbach committee, of the literary committee, and of the committee on haunted houses, but not because they do not contain a great deal of very interesting and striking matter. The addresses of the president, too, are models of clear, careful, and forcible writing; and the proceedings as a whole cannot fail to produce a strong effect upon a reasonably unprejudiced reader, especially when it is considered that all this is in addition to the varying amount of testimony and experience that has been for years in the possession of nearly all of us. In no other subject has there been such a long dispute over the reality of the phenomena: even the witnesses to globular lightning have gained credence for themselves at last. No other subject, as is perfectly natural, has been so inex-

tricably mixed up with fraud and chicane, and has fallen, in consequence, under such a weight of obloquy. There has usually been, besides, a peculiarly 'unwashed' flavor about the possessors of these mysterious powers which are denied to people in general. The travelling mesmerizer has not been an attractive specimen of humanity, and to that fact has been allowed more than its due effect. In other undecided scientific questions, weight of authority has counted for something, but not the weight of a man's family connections. Even when it was said that such unexceptionable witnesses as De Morgan and Wallace and Crookes had become convinced that certain facts not generally admitted were really facts, one could not help believing that they differed in some way from the ordinary sane scientific man, and that some peculiar crookedness of mental vision was the source of their strange belief. Another refuge of incredulity has been national and sectional distrust: it was chiefly outside of the centres of learning that such things went on. Mr. Sidgwick was once told by a German, that they happened only in England or America, or France or Italy, or Russia, or some half-educated country, but not in the land of *geist*. If this society does not at once convince all the world of the truth of its phenomena, it has at least accomplished the feat of suddenly elevating them into the region of respectability; and hereafter any one can admit his belief in them without shamefacedness. Now that mesmerism and mind-reading have ceased to be exclusively the property of travelling-shows and after-dinner entertainments, and have become a subject of experiment in laboratories, it is to be hoped that their extent and limitations will be speedily defined, and that the vagueness and haze in which they have hitherto been enveloped will soon be replaced by definite knowledge.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

U. S. geological survey.

Study of metamorphic rocks. — Prof. R. D. Irving, after consultation with the other lithologists of the survey, and with Dr. Williams of Baltimore, is confirmed in his view of the occurrence of a secondary brown hornblende (as announced by him in 1880 and in 1883) produced by the alteration of augitic minerals. This occurrence is one hitherto denied by the best German authorities; and the cases described by

Mr. Irving have been supposed to be probably cases of envelopment such as are well known to occur. This, of course, has no reference to the occurrence of a green hornblende as an alteration product of augite. Most of the sections made by Mr. Irving and his assistants, showing secondary hornblende, show this variety, only a few localities yielding rocks in sections of which the brown variety occurs as a secondary product.

Mr. Merriam, of Professor Irving's division, has been experimenting on the photographing of thin

rock-sections directly with the microscope, with very satisfactory results. It is hoped to use this method of preparing plates for publication, to be reproduced by some heliotype or autotype method. Mr. Merriam took the field the latter part of May in south-eastern Dakota, where he proposes to study the quartzites exposed at a number of places between the James River and the Minnesota state line.

Mr. Vanhise, during May, continued his microscopic work, having prepared some forty new written descriptions of greenstones, chiefly from the original Huronian of the north shore of Lake Huron. The microscopic as well as field study of this formation has been found necessary, as it forms the type with which the rocks of all the other so-called Huronian areas must be compared.

Mr. Vanhise has also prepared a number of new sections, including some additional ones of the sandstones which he has described in his paper on secondary enlargements of felspar fragments published in the *American journal of science* for May. The new sections show the enlargements even more distinctly than the ones previously described by him,

and leave no room for doubt as to the correctness of this very important observation. Mr. Vanhise will probably take the field in north-western Michigan in the agogebic belt of Huronian schists.

Unalashka sands. — Mr. J. S. Diller's report on the Unalashka sands will be published by the U. S. signal-office, and the geological survey has promised to examine and report upon any other volcanic sands or atmospheric dusts that may be collected by that bureau. Their observers, especially on Mount Washington and Pike's Peak and in Alaska, have been instructed to collect and preserve any sands or dusts that may fall, or be brought down from the air by rainfall.

Artesian wells. — Prof. T. C. Chamberlin has prepared a paper on artesian wells for the fifth annual report of the survey.

Dr. Peale has reports from Montana that work has been resumed on the artesian wells at Helena and at Billings, and that the second boring at Miles City, on the Yellowstone, reached flowing water at a depth of four hundred and fifty feet, which is a hundred feet deeper than in the first well.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Cincinnati society of natural history.

July 1. — Dr. Walter A. Dun read a paper on the recent floods in the Ohio valley. He tabulated the measurements of all the floods since 1832 of which we have trustworthy records. The river has reached the height of fifty feet and over, fourteen times since 1832. All of these floods except one (that of August, 1875), have occurred in the winter months, and seven in the month of February. The extremely high water is the result of a long-continued and widely extended rainfall upon an accumulation of ice and snow, or upon the frozen ground. These conditions are sufficient to account for floods, not considering the question of the reduction of timber areas. — Mr. Charles Dury, in a brief paper, described the finding, for the first time in our locality, of *Adranes LeContei*, a beetle inhabiting ants' nests. This beetle is kept by the ants for the honey-like secretion which it exudes. — Mr. Joseph F. James stated that a recent discovery in the lower Silurian rocks of Clark county, O., makes it clear that some of the so-called 'fucoids' are undoubtedly caused by the oscillation of crinoid stems over the soft mud.

Brooklyn entomological society.

June 29. — Mr. J. B. Smith read a paper on some structural modifications of the Noctuidae with reference to their geographical distribution. Three typical faunae inhabit America north of Mexico; the northern of which, the Labrador fauna, is typical; the eastern agreeing in all essential characteristics with that of central Europe; and the western, peculiar to this country, reaching to the Pacific, thrusting long

extensions into the southern states, and small spurs into the middle states. The northern fauna is typically represented by *Anarta* and the *Pachnobia* group of *Agrotis*, and is characterized by small head, smooth clypeus, often narrow ovate eyes, plump figure, and long, hairy vestiture. The northern species of *Plusia*, of which *P. Hochenwarthi* may be considered typical, share this tendency to ovate eyes, and, having also the tibiae spinose, must receive separate generic designation. *Caloplusia* is proposed to designate these forms, which usually also have the secondaries yellow. This northern fauna is indicated again in the high north-west, and is traceable in the mountainous regions of northern New York and the New-England states. The eastern fauna is characterized by more proportionate head, the front usually smooth, the body vestiture scaly, usually overlaid or intermixed with hair. The tibiae, when armed, are usually all of normal length; and the armature consists of spines. The maculation is normally noctuidous, and the wings are ample. The western fauna is most peculiar. The front is strongly modified, tuberculate, rugose, or excavate: the tibiae are heavily spinose, the anterior pair often shortened, and the armature consisting of long, corneous, claw-like processes. The ♀ oviduct is also more or less prominently extruded. As a whole, the heliothid type prevails; and even *Agrotis* takes a distinct heliothid tendency in the tuberculate front and heavily armed fore-tibia of the western species. Belonging to no special locality, but perhaps more distinctly south-western, is that group of which *Phurys* and *Syneda* are typical, and which agrees in distribution with the *Tenebrionidae* among the *Coleoptera*. The speaker asked, What is the peculiar circumstance

that demands of our western fauna this abnormal frontal development, the heavy tibial armature, and the corneous, lengthily extruded ♀ ovipositor?

Torrey botanical club.

June 10. — Mr. P. H. Dudley exhibited specimens and gave a brief account of his recent studies of wood sections. A large number of micro-photographs of transverse, radial, and tangential sections of our timber-trees were shown. Among the specimens were *Sequoia sempervirens*, in which attention was called to the very large cells (none less than a tenth of an inch in length), and to the fact, that, in this and other conifers examined, the pits in the cell-walls are only seen in abundance in the radial sections; *Catalpa speciosa*, which has lately been extensively employed for railroad-ties in the west; *Ailanthus glandulosus*, which the speaker stated he had found to contain the greatest number and largest ducts of any wood yet examined; *Liriodendron tulipiferum*, in which the ducts are very numerous but small; *Maclura aurantiaca*, in which the parenchymatous tissue within the ducts was plainly noticeable. In the white oak, chestnut, and black walnut, it had been observed that these parenchyma cells shrink away, in drying, from the inside surfaces of the ducts and from each other, then appearing as separate vesicles.

NOTES AND NEWS.

A LIST of the published writings of Spencer Fullerton Baird from 1843 to 1882, with indexes, compiled by George Brown Goode, the first of a proposed series of bibliographies of American naturalists, forms Bulletin No. 20 of the U. S. national museum. In a prefatory note, Mr. Goode explains that since 1874 he has been collecting materials for 'An index-bibliography of American ichthyology,' which will embrace "not only anatomical and descriptive ichthyology, but the literature of the fisheries, angling, fishery legislation and diplomacy, fishery statistics, and the commerce of the fisheries." Besides the titles and references, notes upon what each paper contains, and, in case of important papers, synopses of their contents, will be given: these notes will include references to every published engraving. It is hoped to finish this work in 1884, including in it material published before July of that year. The bibliography of Professor Baird's writings is apparently in part material collected for the above-mentioned work, although notes are wanting to many titles. Other special bibliographies of prominent naturalists are in preparation, among which one of Charles Girard and of Theodore Gill, by Mr. Goode, and one of Isaac Lea by Mr. Newton P. Scudder, are announced.

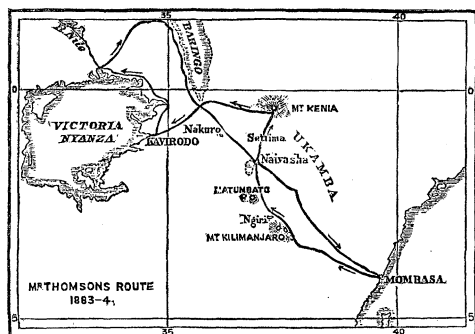
The articles recorded for Professor Baird number 1,063 titles; the numerous notices, abstracts, and reviews which appeared in *Harper's magazine* and in *Harper's weekly* being cited only in their reprinted form in the *Annual record of science and industry*. The general plan of this special bibliography is commendable. An excellent biographical sketch of Professor

Baird follows the prefatory note, and is supplemented by a portrait, which Professor Baird refused to allow to be inserted in the work, but which Mr. Goode has kindly sent to as many as possible of the recipients of the bibliography. It is the same which appeared in *Science*, No. 5. The list of genera (1) and species (32) named in honor of Professor Baird is pardonable material, perhaps, with which to fill three pages of a government publication. This form of honoring the names of naturalists means little, and has just reached the maximum of its absurd development in England, where an entomologist has calmly named a butterfly after himself. The real honor due Professor Baird as organizer and scientific worker is not enhanced by this valueless list. The chronological catalogue of papers occupies 246 pages of the work. In some cases the notes are long, and embrace lists of the genera and species, and even of the varieties, treated of in some of Professor Baird's more extensive works. This may be a practicable or even a desirable method in bibliographies of workers in vertebrates, but would become unwieldy were it carried out for those whose work lay in some other portions of the animal kingdom. Following the chronological catalogue are a systematic catalogue and a list of species discussed and illustrated, both referring, by number and by condensed title, to the list of titles. An alphabetic index of subjects — not scientific names — closes the bibliography.

A commendable feature of this bibliography is the complete independence of each entry, allowing the catalogue to be cut and pasted on cards without additional writing. There are points in which the mode of recording might be bettered. Initial capital letters are very properly discarded, although with some inconsistency of usage, from numerous words in titles of papers, following the practice of many modern bibliographers; but why should the compiler retain initial capitals in such unimportant parts of the title-page as 'With Eighty-seven Plates of Original figures,' on p. 83? Considerable condensation might be made by using only arabic numerals, and by considering p., pl., fig., and like abbreviations, plural as well as singular. Thus 'pp. i.-xvii., 1-496, pll. i.-xxxii.,' would be more tasty, and more easily read, if printed, 'p. 1-17 + 1-496; pl. 1-32.' The space occupied by [...], in recording titlepages, might be given to more practical purpose, for indicating the actual size of volumes in centimetres (or even in inches), instead of using, as was done, the indefinite indications 8vo and 4to.

— *Nature*, June 19, states that letters addressed to the secretary of the committee of the British association for the exploration of Kilimanjaro have just been received from Mr. H. H. Johnston, dated from the British residency, Zanzibar, May 13. After consultation with Sir John Kirk, Mr. Johnston had selected the Mombasa route for Kilimanjaro, and was expecting to depart for that port in about a fortnight's time. The country between Mombasa and Chaga was said to be quiet, and to present no serious difficulties in the way. Mr. Johnston had succeeded in obtaining the services of three of the same bird-

skimmers that had been employed by Dr. Fischer, and of a botanical collector trained under Sir John Kirk, of whose kindness and assistance he speaks in the highest terms. Mr. Johnston, in spite of the trying climate of Zanzibar, was in excellent health, and had strong hopes of the success of the expedition.



We are pleased to learn that Mr. Joseph Thomson has arrived safely at Zanzibar from the expedition he undertook to the Masai region. It will be remembered that Mr. Thomson left England in the end of the year 1882; his object being to proceed by Mount Kilimanjaro to the almost unknown country of the Masai, and to settle the question of the existence of a Lake Baringo to the east of Victoria Nyanza. Mr. Thomson left Zanzibar in the spring of last year, but, after proceeding some distance, found the country so disturbed owing to the recent passage of a German explorer, Dr. Fischer, that he was compelled to return precipitately to Mombasa. In July last, however, he started again, and has evidently accomplished his work in a way quite worthy of his previous record. Passing round the north-eastern side of Mount Kilimanjaro, Thomson proceeded north to Lake Naivasha, halfway between Kilimanjaro and Mount Kenia; then on to the latter mountain, and, by way of Lake Baringo, to the shores of Victoria Nyanza. This latter lake he skirted as far as the outlet of the Nile, returning by a more northerly route, striking the west coast of Lake Baringo, and proceeding south and south-east by Ukambani to Mombasa. It is satisfactory to record that no lives have been lost except by illness. The telegram which the Geographical society has received from Sir John Kirk does not, of course, enter into minute details; but, from its general tone, it is evident that Mr. Thomson will have an interesting and instructive story to tell when he returns. The telegram does not state positively that Mr. Thomson found a lake where Baringo is placed on our maps; but, as Baringo is mentioned as having been touched at, it seems most probable that the information obtained from natives by the sagacious Wakefield is correct. All the country traversed by Mr. Thomson's expedition to the north of Lake Naivasha is new ground, hitherto untraversed by any explorer. Dr. Fischer, in his

recent expedition, reached only as far as the lake just mentioned.

— In the anthropological section of the British association meeting at Montreal, the following specially American topics, as to several of which Canada affords important evidence, are suggested for papers to be read: The native races of America, their physical characters and origin; Civilization of America before the time of Columbus, with particular reference to earlier intercourse with the old world; Archeology of North America, — ancient mounds and earthworks, cliff-dwellings and village-houses, stone architecture of Mexico and Central America, etc.; Native languages of America; European colonization, and its effects on the native tribes of America. The papers on each subject will, as far as possible, be grouped for reading on the same day, so as to insure a general discussion.

— The *Daily Iowa capital* of June 24 contains an account, by Prof. H. W. Parker of Grinnell, of a large mammoth recently found in that city in digging a cellar. One of the remains is a molar tooth fifteen inches long, and which might have been sixteen or more inches before the end of the crown was broken off and lost. It weighed fifteen pounds when first unearthed. The other principal relic is a tusk, which must have been at least eleven or twelve feet long: it now measures, along the centre, seven and a half feet, and, where broken off at the end, the diameter is four inches; the largest diameter is eight inches. Two years ago a small tooth, and fragments of bone, including part of pelvis, were found in digging a cellar adjoining. Other fragments were exhumed last year from a cellar about three rods north of the site of the tusk. The tusk occurred five feet below the surface, the tooth and other fragments about eight, in yellow clayey loam. The Davenport elephant-bones, from a railroad cut in the bluff, were found in yellow clayey loess, twenty-one feet below the surface, and separated by three feet of bluish clay from an old peat-bed and ancient soil, probably similar to that which is said to exist everywhere under our prairies, at an average of twenty-five or thirty feet below the surface. At Davenport the boulder clay of the glacial period underlies the ancient soil.

— One of the results of the deep-sea dredgings of the Albatross was the discovery, at a depth of nineteen hundred and seventeen fathoms off the Atlantic coast, of probably the largest known amphipod crustacean, *Eurythenes gryllus* Bock. The few previously known specimens came from Cape Horn, Greenland, and Finmark, and have apparently all been taken from the stomachs of fishes. This species, and its occurrence in the extreme arctic and antarctic seas, have been much discussed, and are the subject of a long memoir by Lilljeborg; but the apparently anomalous distribution is explained by its discovery in deep water, off our middle Atlantic coast.

— Dr. C. V. Riley, U. S. entomologist, has gone to Europe, partly for rest, partly on special work of the U. S. agricultural department.